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ABSTRACT

The results of a survey dealing with university policies and ethical issues in research and graduate education are presented. The 1988 survey of graduate school deans addressed concerns increasingly voiced within and without universities about academic and professional ethics in the context of faculty and student roles and activities, curriculum, and policies. The four objectives were to: (1) obtain baseline data on the existence and status of a variety of institutional policies governing research and research related activities by faculty and graduate students; (2) gather data on the incidence and handling of reported cases of conflict of interest/commitment and of misconduct; (3) learn what deans believe will be the most important issues relevant to policies and procedures for research and graduate education in their institutions over the next 5 years; and (4) gauge the importance that institutions of higher education attach to training in ethics and values as part of graduate education and the extent to which such training is occurring. A mailed survey was completed by 259 deans of institutions affiliated with the Council of Graduate Schools. Results are discussed as follows: conflict of interest and misconduct; conflict of interest and the role of graduate students; integrity and misconduct in research and scholarship; values training and socialization; university policies and professional ethics; and the university's moral role in research and graduate education. Twenty tables are included. Contains 19 references. (SM)

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UNIVERSITY POLICIES AND ETHICAL ISSUES IN GRADUATE RESEARCH AND EDUCATION

Results of a Survey of Graduate School Deans[1]

Karen Seashore Louis, Judith P. Swazey and Melissa S. Anderson[2]

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University Policies and Ethical Issues In Graduate Education and Research

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Objectives and Perspectives

As part of a project on values training and ethical issues in the graduate education of scientists and engineers, we conducted a survey of graduate school deans in the spring of 1988 that dealt with university policies and ethical issues in research and graduate education. The survey and larger project address concerns increasingly voiced within and without universities about academic and professional ethics in the context of faculty and student roles and activities, curriculum and policies (Alpert, 1985; Wade, 1984). While the project is focused on graduate students, a basic assumption underlying our research is that professional values and ethical behavior are learned largely from observing role models and the larger culture of the institution; therefore, attention to administrative policies and attitudes, (which partly reflect an institution's values) and to faculty behavior, are critical.

The survey had four main objectives: (1) to obtain baseline data on the existence and status of a variety of institutional policies governing research and research-related activities by faculty and graduate students; (2) to gather information on the incidence and handling of reported cases of conflict of interest/commitment and of misconduct; (3) to learn what deans believe will

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be the most important issues relevant to policies and procedures for research and graduate education in their institutions over the next five years; and (4) to gauge the importance that institutions of higher education attach to training in ethics and values as part of graduate education and the extent to which such training is occurring.

Two areas of faculty and student activities and institutional policies emphasized in the survey were conflict of interest and research misconduct which, while traditionally viewed as central concerns inside the university, are receiving increasing public attention.

Conflict of interest on the part of faculty. Here there are two issues. First, there is the hoary question about whether faculty spend excessive amounts of time in consulting or other non-scholarly activities that may reduce their productivity (Boyer and Lewis, 1985). Second, there has been a more recent debate about the potential for conflict of interest among faculty who are involved in commercial applications of their research or in other university-industry relations. Serious questions have been raised about the use of university and government funds for non-university purposes (Blumenthal, et al., 1986; AAU 1985), or the funding of faculty research from private sector organizations in which the individual holds financial interest.

Research misconduct among faculty and graduate students. There has been an increase in highly publicized incidents of scientific fraud, which has led to serious questions about the ability of the scientific disciplines to police themselves using traditional peer review methods (Woolf, 1981; Relman, 1983; Greene, et al., 1985; Culliton, 1988). Although these issues are considered extremely important in the scientific community, little is known about the extent and handling of such cases in the non-biomedical sciences.

Control Over Science: Whose Responsibility?

The traditional view of the scientific enterprise was that oversight on such ethical issues occurred through networks of social and interpersonal influence and control. Control over ethical behavior was delegated to the scientists themselves (Merton, 1942). Scientific values are preserved largely as a result of the extended socialization period for graduate students and younger faculty members, during which they are exposed to role models who demonstrate the ethical bases for solid research and professional behavior. Professional self-monitoring is, in this view, reinforced by the development of guidelines for professional behavior and ethics by the various disciplinary societies.

The traditional model for maintaining high standards of scientific behavior and ethics is eroding, however. Current challenges to scientific and professional value systems are enormous. As Sechrest (1987) has pointed out, there are many external and internal pressures to engage in shoddy research, or to falsify data, and the formal mechanisms of scientific control (peer review, replications, etc.) are so fallible that the probabilities of getting caught are low. In addition, a number of people have remarked that the social structure of science is changing, at least in the United States, to promote entrepreneurship (Louis, et al., forthcoming) and "mission based science" (Fuhready, 1987), which adds further ambiguity to the nature of scientific values and norms. Thus, there is renewed concern about the degree to which socialization and professional controls ensure appropriate scientific behaviors and values with respect to the conduct of research, institutional and disciplinary commitments, and modes of relating to other scientists in their own and other universities.

Institutional Response

Since informal, professional and discipline-specific controls appear to be ineffective, there has been a shift toward organizational and institutional control. Many organizations are involved in this shift, including the government (through regulations such as those governing human subjects) and professional associations, but the sector that is under the greatest pressure to increase their role in monitoring faculty research behavior is that of higher education. In 1983, the Association of American Universities urged institutions of higher education to adopt specific policies to encourage intellectual honesty, and to develop procedures to deal with alleged fraud or dishonest behavior (Chronicle, 1983). This shift in the balance of professional to institutional controls has not been entirely easy. Greene, et al. (1985) indicate that between 1982 and 1984, institutions of higher education were in a state of crisis in responding to these demands due to lack of consensus about topics such as what constitutes fraud, the role of the university as a policeman, and issues of due process. These concerns have not abated in the interim (AAU, 1985; Blumenthal, et al, 1986).

Involvement of universities in developing policies to monitor scientific research has been met with mixed reactions from faculty, many of whom are relieved to have regular institutional channels to deal with these difficult issues, but who are also concerned about maintaining professional control. One recent study in toxicology, for example, has confirmed the suspicion that individual scientists are more likely to prefer bureaucratic rather than individual "whistle blowing" responses when faced with ethical dilemmas (Bronstein, 1986). This is not surprising, since whistle-blowers have been shown to receive little support or sympathy among their scientific colleagues,

which suggests serious limits to the efficacy of the traditional models for maintaining scientific integrity (Jackson and Dalle Mura, 1988). Bronstein also indicates that professional associations are unlikely to emerge as major actors in the scientific control system, as they play a minimal role in uncovering and dealing with violations of their professional codes.

In this study, we will refer to the involvement of institutions in writing new policies, or revising old policies governing research as the level of institutional research policy ferment.

Institutional Characteristics that May Affect Responses

There is reason to predict that the level of institutional concern and response may vary between higher education institutions of different types. A number of different institutional characteristics are hypothesized to affect individual and institutional behavior:

Carnegie Classification: Since there is (presumably) more research conducted in institutions that are classified as "Research I" and "Research II" by the standard Carnegie classification system, the opportunities for problems to arise and require institutional responses may be greater. The Carnegie Classifications are presented in Appendix 1.

External Funding: Although all of the Carnegie institutions in the Research I category must receive at least 35 million dollars a year in external research funding, some receive considerably more. In addition, some Research II and Doctoral level institutions have high levels of funding as well. Many have assumed that the pressures for fund raising and the commitment to big laboratories and projects have fueled the recent wave of problems relating to sources of funds and research misconduct (Wade, 1985). We therefore expect funding levels to be associated with higher rates of

ethical problems and more institutional response.

Auspices/Control: Public universities are generally under more careful scrutiny than private institutions, at least where questions are raised concerning the use of state facilities and funds. Thus, one would predict a higher level of concern and response from the public sector.

Size: In bigger institutions, with more faculty and students, there may simply be more opportunities for problems to occur.

Institutional Predisposition: Some institutions may have been more active than others in developing formal policies to regulate research, rather than relying on the older models of professional controls. This institutional history may affect the rapidity with which they have reacted to more recent and publicly debated concerns.

Several questions about the behavior of university faculty and graduate students and the involvement of universities in dealing with this behavior suggest themselves from the above discussion:

(1) What has been the incidence of suspected or reported ethical problems in the above three areas in the past five years? How are these being handled?

(2) Has the recent perceived crisis in scientific ethics resulted in an increased university role in policing faculty or graduate student behavior? In what ways and in what areas (commitment, conflict of interest, and fraud) is oversight increasing? How are reported problems handled?

(3) Has the recent perceived crisis in scientific ethics affected the university's concern about ethical socialization in graduate schools?

(4) What ethical issues in faculty or graduate student behavior are likely

to dominate attention in universities in the next few years?

(5) How does institutional experience and response vary by the characteristics listed above?

Methods and Data Sources

As part of a larger project on values training and ethical issues in the graduate education of scientists and engineers, we conducted a survey of graduate school deans in the spring of 1988 that dealt with university policies and ethical issues in research and graduate education. The mailed survey was sent to the 392 deans whose institutions are affiliated with the Council of Graduate Schools. Standard techniques for improving response rates, including follow-up postcards, a second mailing, and personal letters to non-respondents, resulted in returns from over 75%. A number of the institutional respondents were eliminated from the analysis presented here for a variety of reasons, including unusable or only partially filled out questionnaires (primarily from Comprehensive institutions that did not have doctoral programs that were based in the kinds of scientific research that the questionnaire dealt with) and late returns. As Table 1 indicates, return rates were higher among the more intensive research universities. Usable surveys numbered 259, representing 66% of the total universe of CGS members.

This first report on the survey summarizes some of our major findings and indicates discussion areas generated by those findings. Since the data are in a preliminary stage of analysis, we ask that persons reviewing this report not distribute or cite it without permission of the authors. We welcome comments from those to whom the report is being distributed.

The survey covers the following areas: the status of general policies governing research behavior and related activities, including conflict of

interest and commitment, and research misconduct; incidence of problems in these areas, and general methods of handling confirmed cases of problems; emerging ethical issues ; and university involvement in ethical training for graduate students. In addition, institutional information (auspices, Carnegie classification, faculty and student population, number of doctoral programs, external research funding) was collected.

RESULTS

Incidence of Reported or Verified Ethical Problems

Conflict of interest and commitment: Conflict of interest and commitment was defined implicitly in the questionnaire as faculty involvement in firms whose products are based on their own research, university investment in firms whose products are based on faculty research, unacceptable amounts or types of consulting or other outside employment by faculty, or faculty involvement in research whose publication is restricted by funding sources.

The data indicate that half of the institutions have had no reported instances, while 39 % have had one to five (Table 2). Four % (9 institutions) appear very different, however, having 40 or more reported instances. We assume that this small group represents those institutions that have developed a policy requiring faculty to report all possible instances of commitment/conflict of interest issues, rather than institutions at which conflict of interest is concentrated. The nine institutions are all public, and six of them are Carnegie Classification Research I or Research II.

Conflict of interest and commitment appears to be strongly associated with the research intensiveness of an institution, using the standard Carnegie

classification system.[2] Sixty-three % of the Research I and II institutions indicated that some instances of possible conflict of interest had been reported recently, whereas 53 % of the Doctoral I and Doctoral II institutions and 29 % of the Comprehensive institutions had received reports of possible conflict of interest. The nine institutions with forty or more reported instances account for seven % (six) of the Research institutions and four % (three) of the Doctoral institutions.

Research intensiveness may also be judged by the level of external funding for research. The criterion that we applied was somewhat more stringent than the Carnegie Research I classification. The latter uses 33.5 million dollars in federal support as the cutoff point for Research I institutions, while our top category was over 50 million dollars of external research funding. Of the 55 institutions which receive more than 50 million research dollars annually from external sources, 69 % reported that one or more instances of alleged faculty conflict of interest had occurred during the last five years. Moreover, 29 % of the institutions in this category had more than five reports, and seven % had 40 or more reports. This distribution contrasts markedly with the distribution of reports at institutions with relatively low levels of external funding for research. Among the 80 institutions which receive less than $5 million in external research funding, only 25 % reported any instances of possible faculty conflict of interest. Only one of these

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[2] The Carnegie classification system consists of seven categories of institutions that may have at least one doctoral program. For this analysis, we collapsed the categories to three: Research I and Research I (Research institutions); Doctoral I and Doctoral II (Doctoral institutions) Comprehensive. The results presented here do not change if the broader categories are used, but the cell frequencies are often too small for statistical analysis. "Other" institutions (such as military academies and medical schools that grant Ph.D.s.) are included in regression analyses but not in the cross-tabulations.

institutions had more than five reports of conflict of interest and, in fact, this institution had over forty reports.

Research misconduct among faculty and graduate students: Forty % of the deans surveyed had received reports of possible faculty research misconduct during previous five years, and only 2 % (six) had received more than five reports (Table 3). Across Carnegie classes, the general pattern for reports of faculty research misconduct is similar to the pattern for reports of conflict of interest. Sixty % of the Research I and II institutions had received reports of possible misconduct, while the corresponding proportions for the Doctoral I and II and Comprehensive categories are 36 % and 22 %, respectively.

This contrast is even more pronounced when we look at the other measure of research intensiveness: external funding. Institutions which receive the highest levels of external support also report more instances of alleged misconduct. Of the institutions receiving more than $50 million in external research funding, 69 % had been notified of possible faculty misconduct. In contrast, only 19 % of the 75 institutions receiving less than $5 million in external funding had any reports of faculty misconduct.

Turning to instance of suspected research misconduct by graduate students (Table 4), the patterns are very similar to those for faculty research misconduct. For example, reports of graduate student misconduct were received at 40 % of all institutions, the same proportion as received reports of faculty misconduct. External funding level does not distinguish among reported graduate student misconduct to the same degree that it does for faculty misconduct, although the differences are significant: 52 % of institutions receiving more than $50 million had reports of graduate student

misconduct, whereas 29 % of institutions receiving less than $5 million had such reports.

The data do not suggest that research misconduct is rampant in higher education. Only 20 % of the deans indicated that any instance of verified misconduct occurred among their graduate faculties during the past three years (Table 5).

As with conflict of interest and commitment, however, the rate of misconduct increases with research intensiveness. Among the institutions that receive more than $50 million per year of external research funding, 41 % reported at least one verified instances of faculty research misconduct in the previous five years, as compared with 17 % of those receiving between $5 and $50 million, and 10 % receiving less than $5 million. No institution, however, reported more than three verified instances of faculty research misconduct.

Research misconduct by graduate students is reported and verified more frequently, and at a greater proportion of institutions, than faculty research misconduct. Thirty % of the institutions had verified reports of alleged graduate student research misconduct, and 2 % (five institutions) received between six and 15 reports (Table 6).

Research intensiveness seems to exert some pressure toward misconduct on graduate students, although the number of misconduct reports does not vary by external funding categories as much as for faculty. Of the 52 institutions that receive more than $50 million in external support and that responded to this item, 33 % had verified graduate student misconduct. Corresponding proportions for those that receive between $5 million and $50 million and less than $5 million are 35 and 19 %, respectively.

Institutional Responses

Handling Alleged Ethical Problems: It appears that the majority of reported instances of conflict of interest or commitment are investigated (Table 7). Of the 121 institutions which had at least one report of faculty conflict of interest and which provided information on investigation of conflict of interest, 55 % investigated every reported incident, 31 % investigated some but not all of the reported incidents, and 14 % investigated none of the reports. Lack of follow-up on reports seems greatest in the Doctoral institutions: 22 % indicated that they had some reports of possible faculty conflict of interest but did not investigate any of them. The corresponding percentages for the Research and the Comprehensive institutions are 9 and 13, respectively. At the other end of the scale, 47 % of the Doctoral institutions indicated that they investigated every reported instance of conflict of interest, while 55 and 61 % of the Research and the Comprehensive institutions, respectively, did so.

Institutional auspices seems to bear a relationship to the vigor with which conflict of interest and commitment is investigated. While 14 % of both public and private institutions failed to examine any reported instances of conflict of interest or commitment, the proportions of institutions which followed up every reported case were 49 % for public institutions and 69 % for private institutions. (We should point out that previous tables show that the number of alleged misconduct cases is also slightly higher in the public institutions.)

Levels of external research funding exhibited no significant relationship with the investigative diligence of institutions.

The questionnaire did not discriminate between the number of reports that

deal with conflict of commitment (consulting, outside employment) versus conflict of interest (using university position to further personal economic position, etc.). However, we may infer from other evidence that the latter is of more concern to the deans of research intensive universities, while the former is of greater concern to comprehensive institutions. When asked to indicate the four top ethical issues facing the university (from a list of 23), 15 % of the Research deans rated faculty consulting as an issue, compared with 27 % of the Comprehensive deans. Faculty financial involvement in private firms, on the other hand, was ranked among the top four by 28 % of the Research deans, and 12 % of the Comprehensive deans. Their concern does not extend, however, to a perceived need to develop reporting requirements to cover conflict of interest on the part of faculty, which was perceived as a priority by only 10%.

In the case of research misconduct, we examined two aspects of institutional procedures for dealing with reports. The first is the investigation of reported incidents, while the second is the institution's acceptance of resignations or withdrawals in lieu of formal investigations or disciplinary action.

Investigations of alleged faculty misconduct is apparently vigorous: 78 % of the institutions where misconduct was alleged stated that they undertook investigations of every incident, 16 % investigated some but not all of the incidents, and six % did not investigate any reported incidents (Table 8).[3] Again, lack of follow-up appears most often among the Doctoral institutions: 17 % failed to investigate any reported incident. By contrast, four % of

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[3] The survey does not provide information on investigation of instances of graduate student research misconduct.

Research institutions and none of the Comprehensive institutions failed to follow up charges of research misconduct among faculty. In each Carnegie class, over three-quarters of the institutions investigated every reported incident.

As in the case of conflict of interest, private institutions appear somewhat more ready to pursue reports of research misconduct. Ninety-one % of private institutions investigated every instance of possible research misconduct, while the corresponding figure for public institutions is 74 %.

One reason why reports may not be fully investigated is that institutions may permit faculty members to resign or graduate students to withdraw without further disciplinary action when faced with allegations of research misconduct. Overall, institutions appear to apply somewhat stricter standards of accountability to their faculty than to their graduate students (Tables 10 and 11). Eighty-six % of all institutions reported that they have never permitted a faculty member to resign in lieu of facing a formal investigation of research misconduct, while 74 % have never allowed a graduate student to withdraw in similar circumstances.

It appears here that research intensiveness is associated with somewhat greater leniency. Among the Comprehensives, 91 % do not permit faculty resignations and 84 % do not permit graduate student withdrawals. Of the Doctoral schools, 90 % do not allow faculty to resign and 77 % do not permit students to withdraw. Among the most research intensive, the Research I and II institutions, 79 % have never permitted a resignation and 65 % have never accepted a student's withdrawal without further action.

When research intensiveness is measured by level of external research funding, a similar pattern emerges. The proportion of institutions which have

never accepted a faculty member's resignation in lieu of a formal investigation is 94 % among institutions which receive less than $5 million, 84 % of institutions which receive between $5 million and $50 million, and 78 % among institutions receiving over $50 million annually.

This pattern is not as pronounced in cases of graduate student misconduct. Here the greatest leniency appears to be shown by institutions taking in $5 million to $50 million of external research support per year. Of these institutions, 67 % report that they have not accepted a student's withdrawal in place of investigative action. Moreover, nine % of these institutions always or almost always give this option to a student accused of research misconduct.

The Development of Institutional Control over Research and Ethics

Existing Policies: The deans were asked to identify stages of policy development on various issues at their institutions. For each issue, they could indicate that the institution had no related policy, was in the process of developing a related policy, or already had written policies or guidelines dealing with the issue. In the last case, respondents were further asked to indicate whether or not the policy had been written or revised in the past three years. These figures are presented, for all institutions, in Table 12.

There are some clear commonalities. Most institutions, irrespective of type, have policies that govern faculty consulting or conflict of interest. A quarter, or fewer, have policies governing university-foreign government relationships in research, the preparation of recommendations and references, or scholarly publication guidelines covering issues such as authorship. Between these two extremes, however, there is a lot of variation. It is clear that more research intensive universities, whether measured by the Carnegie

classification or by external funding, are more likely to have virtually every other kind of policy: those who do the most research are also the most regulated. There is a very slight tendency for public institutions to have more research policies than privates, but the differences are quite small.

Major areas of policy development were assumed to be those which were most often receiving attention, either as emergent policies or as recent revisions of existing policies (Table 12). Recent policy development in graduate institutions has centered on seven issues, listed here with the percentage of all institutions surveyed which are presently involved in related policy action:

1) patent ownership and royalties (57 %),
2) research misconduct (54 %),
3) hazardous substances used in research (44 %),
4) university-industry research relations (43 %),
5) plagiarism (36 %),
6) faculty involvement in firms whose products are based on the faculty member's own research (35 %),
7) amount or type of consulting or other outside employment by faculty (25 %), and
8) disclosure of misconduct to research sponsors (24 %).

The particular focus of attention shows some variation across types of institutions, and indicates the different ways in which institutions have been responding to the perceived crisis of research ethics. Research misconduct has been an area of significant policy development for nearly three quarters of the Research institutions and over half of the Doctoral institutions, and policy action about plagiarism, another form of research misconduct, has also

been high. In contrast less than a third of the Comprehensive institutions have worked on research misconduct policies, and less than 25% have been dealing with plagiarism policies. Although less than 1/3 of the institutions have policies governing conflict of interest/commitment for graduate students, this is not an area where policy development is occurring.

Approximately 40 % of the Research and Doctoral institutions have been working on policies related to conflict of interest (faculty owned firms), while few Comprehensives have been so involved. Outside consulting (conflict of commitment) appears to have been a more turbulent policy issue at Comprehensive institutions than at the other types of universities. While hazardous substances and university-industry relations are of concern across all Carnegie types, plagiarism and relations with firms making use of faculty research are receiving particular attention at Research and Doctoral institutions, but not at Comprehensive institutions. Thus, although all of the different types of institutions have been involved in policy development with an eye to increasing university involvement in maintaining ethical research behavior, the areas of concern are related to institutional type. When we look across levels of external research funding, the relationship between research intensiveness and policy development with regard to misconduct is equally clear.

New policy issues relating to research conduct: Embedded in the general battery on research policies were several questions concerning policy development focused on issues that are thought to be emerging issues in research conduct: "access to data" reflects problems concerning data ownership and whether data are available for checking by others; "scholarly publication guidelines" deals with the problem of authorship credit and the

responsibility of all named authors for the research quality of the paper; "recommendations and references" relates to how the university deals with writing references for faculty and students whose conduct may appear suspicious, or who have been reported for flaws in their research conduct; "faculty supervision of junior colleague and student research" would concern the responsibility of senior faculty for maintaining research quality in their lab or on their project.

None of these show up in the topics that are most likely to have received policy attention in the last three years. For example, guidelines relating to scholarly publication were developed/revised in only 14 % of the institutions, despite all of the recent attention to instances of fraud in which senior scholars were involved as "complimentary authors" who had not reviewed the paper. Access to data was mentioned by 20 %, faculty supervisory responsibilities by 12 % and recommendations by 7 %. There are no clear differences among different types of institutions. Thus, the data suggest that, despite the concerns about regulating conflict of interest and commitment, and dealing with overt research misconduct, universities are somewhat tentative in reaching too far in the direction of regulating faculty behavior with regard to research.

Institutional Predictors of Policy Ferment: To further examine the relationship between institutional characteristics and institutional response, a regression analysis was conducted. The institutional predictors that were used in the unforced stepwise entry models included both variables that were and were not shown to be important during the cross-tabular analysis: The institution's Carnegie classification, the control auspices of the institution (public or private), size (log of the number of faculty), the amount of

external funding (log of the total external research funds and the log of the number of dollars of external funding per faculty member), and the existing level of institutional oversight (number of existing research policies). The results of the regression are shown in table 13. The most important predictor is the institution's history of being involved in regulation of research behavior prior to the last three years. The remaining variables that contribute at least one % to the amount of variance explained do not reach the .05 level of significance. However, the data suggest that larger, non-research intensive universities--those classified as doctoral level or comprehensive institutions--are more likely to be engaged in policy revisions. These are not the institutions that pose the most immediate concerns about the integrity of science, but they are most likely to have not previously confronted the problems of research ethics that were addressed in this study.

Ethical Socialization: Several questions on the survey addressed the degree to which institutions have responded to current concerns about ethics and science by trying to strengthen the traditional base of control over scientific behavior: the socialization process. First, we asked each respondent to rate their institution's current effectiveness in preparing graduate students to deal with the ethical issues that they will face in their fields. In general, they give their institutions relatively low marks (Table 14). Except in the social and behavioral sciences, more than a third rate their performance as "not very effective" or "not at all effective". There is also a clear tendency for the most research intensive institutions, whether measured by Carnegie class or by level of external funding for research, to be more critical of their performance than less research-intensive universities.

Second, we asked "How active a role do you think your university should take in preparing graduate students to recognize and deal with ethical issues in their professional or scholarly field as part of their training?" Respondents strongly endorse a critical role in ethical education [Table 15]. Finally, we asked "Does your university expect that departments will commit instructional time in their graduate programs to ethical issues?". Like the previous question, this was considered an indicator of the university's response to the "ethical crisis" (Table 17).

If we look at the last two questions together, we find that the level of action is less than the level of concern. Overall, 40 % report that their institutions have no expectations of this sort and only ten % have developed formal written policies setting forth this expectation. Here again we see that the more research intensive universities take a more passive stance. Although the Carnegie classification system reveals no significant differences, the most heavily funded universities are less likely to have set expectations about teaching ethics: 56 % of these institutions have neither informal expectations nor formal policies, as compared with 35 % of institutions in both of the other research funding categories.

Institutional Characteristics, Institutional Policies and Reported Ethical Problems

As a final effort to determine what institutional characteristics are most likely to affect the incidence of conflict of interest and commitment, and scientific misconduct, stepwise multiple linear regressions were calculated. The predictor variables were the same as those used in the regressions reported immediately above, plus the variable reflecting policy ferment. The results of these regressions are presented in Table 17.

The number of instances of reported conflict of interest and commitment is not very well predicted by institutional factors: less than 9 % of the variance is explained by the full model. The prediction of reported misconduct is somewhat better: 14 % of the variance in reported faculty misconduct, and 16 % for graduate student misconduct is accounted for. The three types of institutional activity in formal reporting have some common predictors. **In all of the models, the presence of an historical level of activity in formal policy development contributed at least 1 % to the variance explained.** This suggests that institutions that have always given a significant role to the university in setting policies for research and research behavior are also more likely to be active in unearthing current problems where they may be occurring. To put it another way, it seems very likely that the absence of policies makes it difficult for conflict of interest/commitment and misconduct to be reported, as there are no mechanisms in place for reporting to occur. Since, as noted in the introduction, whistle-blowing is a less attractive means of action than reporting (since it involves a less visible and active role for the reporter), this should not be surprising.

If we look at the model predicting reported graduate student misconduct, the relative importance of institutional activism become even clearer. Among those institutions that formally or informally expect ethical issues to be treated in the classroom, the rate of reported graduate student misconduct is higher. We suspect that this increased rate of reporting does not reflect higher actual rates of misconduct, but rather the increased willingness of students and faculty to confront those engaging in suspicious practices in settings where discussion of research ethics is more open.

The two models for which the dependent variable involves faculty behavior both show a significant role for the level of external funding. Institutions that have more research money uncover more problems with faculty behavior, even when other factors, such as auspices, or a previous history of research policy activism are controlled for. This finding supports those who contend that "big science" has the potential to interfere with traditional scientific value systems. Fortunately, perhaps, these institutions are also most likely to be responding to this problem: research funding is also a significant predictor of the level of research policy ferment.

The auspices/control factor also seems to be somewhat important, as it contributes at least one % to the Multiple R in one equation, although it does not reach the .05 level of significance. In the case of faculty conflict of interest/commitment, public institutions are more likely to show levels of activity. We would not interpret this as an indication that public institutions are somehow more ethical than private, but that their public accountability requires them to deal with these issues in a more open way.

Size, which was not an important factor when we examined two-way cross tabulations, emerged as important in one equation. Larger institutions are likely to have a larger number of reported instances of graduate student misconduct.

Issues of the Future: The Deans Predict

The graduate faculty deans were asked to evaluate the importance of various research policy issues for their institutions over the next five years. They were also asked to indicate the four issues that they felt would be most important. These questions were intended to reflect both the absolute and relative importance of different aspects of conflict of

interest, conflict of commitment, and research misconduct.

Items given the highest importance ranking, "critical", were viewed as issues that would absorb the most administrative attention, at least over the next few years. The instructions indicated that an issue should be marked as "critical" only if the respondent believed that a major reconsideration of university policies and procedures in that area would be required. As Table 18 indicates, Deans used this ranking sparingly, as intended. Nevertheless, a number of issues were marked as critical by more than ten % of respondents. These included:

1) animal care and use (18 %),
2) university-industry research relationships (16 %),
3) use of hazardous substances in research (15 %),
4) human subjects research (14 %),
5) patent ownership and royalties (13 %),
6) the development of due process procedures for faculty, students and staff who are alleged to have violated university policies (11 %), and
7) disclosure of research misconduct to funding agencies, collaborators, employers, etc.

It is apparent that this list of critical issues does not give as much weight to issues of commitment, conflict of interest and research misconduct as to the university's broader role in promoting social responsibility in research, and the need to regularize and codify the emerging entrepreneurial role that universities are playing. If these ratings are accurate reflections of institutional priorities, we may not see a greatly increased level of activity with regard to faculty or graduate student ethics in the next few years. This lack of effort predicted for the future may, of course,

be a result of the relatively heavy policy development activity in these areas that has already occurred during the previous three years, and which has been discussed above.

If we look at the proportion of deans choosing each issue as one of the four most critical areas, this assessment is not challenged, and the same priority on issues of social responsibility and regulation of institutional entrepreneurship emerges (Table 18).

A principal components analysis with varimax rotation was used to scale the items in the research policy priorities list. Five factors were identified (Table 19). The first factor was composed of items reflecting the institutions' codification of **legal and contractual issues related to research, and faculty conflict of interest** (university-industry, university-military, university foreign government, patents, faculty involvement in firms, university investment in faculty firms, restriction of publication to protect research sponsors, and conflict of interest disclosures.) Another reflected the **social responsibility dimension** (use/care of animals, human subjects, genetics research and hazardous substances). Three additional factors reflected different aspects of faculty behavior: **procedures for handling faculty research misconduct** (definition of research misconduct, procedures for reporting and investigating, disclosure of misconduct to others outside the university, and due process procedures); **new areas of faculty research misconduct** (access to data, faculty supervision of subordinates, guidelines for scholarly publication); and **other faculty issues** (consulting, plagiarism, recommendations). The items within each of these scales were added and divided by the number of items in the scale.

Using these scales, we investigated the relationship between institutional

types and the importance of various issues. Some key differences emerge. First, public institutions place higher priority on all of the research policy areas. Not all of the differences are significant, but all are in the same direction. Second, there is a strong relationship between the Carnegie classification (and the external research funding variable) and priorities: the more research intensive the institution, the more likely it is to place significantly higher levels of priority on three of the scales: "legal and contractual issues", "social responsibility" and "procedures for handling faculty research conduct". There is no difference in priority levels on the other two scales (Table 20).

CONCLUSION AND DISCUSSION

This preliminary analysis suggests several conclusions and areas for discussion and further inquiry concerning the way universities are responding to various issues in research and graduate education.

Conflict of interest and misconduct. The deans' responses indicate that although the number of reported ethical problems is relatively low, most institutions are attempting to deal misconduct, conflict of interest and conflict of commitment, both in terms of policy development and investigation of alleged incidents. This is particularly true for research intensive universities, where such problems are frequent enough to dispel the notion that they are isolated, idiosyncratic events that "don't happen here." Although research intensive universities experience more ethical problems among faculty than doctoral or comprehensive institutions, they have more policies in place to help deal with them. Moreover, three-quarters of them have been busily refining or adding policies to clarify or strengthen institutional standards and controls. We suspect, however, that much of this

activity may have been a temporary response to external pressures or specific cases, since few deans view conflict of interest, conflict of commitment or research misconduct policies as an area of critically important policy development in the coming years.

The data on the existence and content of policies concerning faculty and graduate student conduct, and on how reported cases of unethical behavior in the areas of conflict of interest and commitment, and research misconduct are handled suggest many avenues of further inquiry. For example, to understand how universities are attempting to deal with actual or potential problems in these areas, it would be useful to know more about how they are dealt with procedurally, the awareness of policies by members of the university community, and how the policies affect procedures. In particular, it would be useful to know more about why a substantial minority of universities who have reported problems do not investigate some or all of them.

Conflict of interest and the role of graduate students. The data on conflict of interest or commitment frame some interesting larger questions about the ways that the status and role of science and engineering graduate students are being defined. Most institutions have policies regarding the amount or type of consulting or other outside employment by faculty, for example, while fewer than one-third have comparable policies for graduate students. This suggests that, in the effort to establish normatively appropriate relationships between industry and universities, graduate students are chiefly viewed as student-learners who do not enter into the conflict of interest equation. This perception, we would suggest, does not fully accord with other dimensions of being a graduate student, which bear the potential of creating role conflicts for students as well as faculty.

Graduate students, for example, can be successful innovators and entrepreneurs in fast-breaking, commercially attractive fields such as molecular biology or computer sciences. Graduate students can earn their living, learn their research skills, and do their dissertation by working on a project supported by industry. In the complex new world of university-industry alliances, then, graduate students are one component of the "ethical dilemmas posed by the metamorphosis of our scientific research force from educators to entrepreneurs..." (Oversight Subcommittee of the House Committee on Science and Technology, 1981, quoted in AAU, 1985, p.6).

Integrity and misconduct in research and scholarship. Several key issues confront universities as they work to develop or refine policies and to make the difficult transition from a policy to workable procedures for handling alleged misdeeds. These issues include establishing (1) standards for the conduct of research, and according to those standards, defining misconduct; (2) procedures for responding to misconduct reports; and (3) sanctions for individuals who are found to have violated ethically acceptable standards. Several policy and procedure elements have proved particularly thorny for many institutions. These include: adequate due process provisions; questions about when and to whom alleged or verified misconduct should be disclosed; and debate over whether suspected miscreants should be allowed to resign in lieu of an investigation or, if misconduct is established, in lieu of formal sanctions (Mishkin, 1988).

Our data on misconduct-related issues such as investigation of reported incidents and options for faculty or graduate students to leave the institution rather than undergo an inquiry or face sanctions, support the view that universities are finding it difficult to establish and follow procedures

for handling misconduct, rather than dealing with individual cases on an ad hoc, situational basis.

Moreover, while a majority institutions have developed a misconduct policy, and have a policy for plagiarism (which most feel should be included in the definition of misconduct) other policies bearing on integrity and misconduct in research and scholarship are not prevalent, even in the most research intensive settings. Fewer than half of the research universities have policies governing access to data (which also involves matters other than misconduct). Policies or guidelines for faculty supervision of junior colleagues or graduate students are in place in at most a third of the institutions that train most of our future scientists. Publication guidelines (covering matters such as authorship credits and retraction of publications), and policies for recommendations and references (which involve disclosure of misconduct as well as a range of other behaviors and competencies) have received policy attention at only one-fifth of the institutions.

If policy development reflects an institution's identification of enduring and important issues, then these aspects of research conduct do not appear to be highly salient matters for most institutions. Nor, at least in the judgment of deans, will the foregoing areas, as well as due process procedures and misconduct per se, be critical policy or procedure matters for their universities to address in the next five years.[4] This lack of anticipated attention is somewhat surprising given proposed federal regulations stipulating how institutions must uniformly define and handle misconduct in

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[4] The survey did not ask whether institutions have, or are developing, due process procedures for faculty, students and staff alleged to have violated university policies.

biomedical research, Congressional interest in mandating strict requirements for dealing with misconduct by recipients of federal funds and a more flexible "framework for institutional policies and procedures to deal with fraud in research" being drafted by a consortium of 10 associations, including the Association of American Universities (Culliton, 1988).[5]

Values training and socialization. A major focus of our project will be on the ways that graduate students in science and engineering learn the values of their discipline and develop an ethical understanding that can serve as a "moral action guide" for dealing with ethical issues they confront in their professional work. This survey provided only limited data on one route for learning about the values and ethical issues of one's profession, that of formal instruction. Future project research will deal more fully with the role of curriculum, as well as what we view as the more powerful and enduring effects of role modeling and other forms of socialization. However, to the extent that courses dealing with professional ethics, science, technology and society, or ethics and value studies do openly address ethical issues and serve as a foundation for developing behavioral standards, our data flag some concerns about the degree to which research intensive universities apparently rely almost exclusively on the more traditional interpersonal and professional models of values acquisition and social control.

Few research institutions have policies or guidelines for faculty supervision of junior colleagues or student research, pointing to a reliance on informal head-of-the-lab and professor standards and behavior. Nor, despite recognized problems with adequate supervision in large research

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[5] Although these proposed guidelines were not written at the time the survey was conducted, the public discussions about guidelines had begun.

laboratories, do deans feel that this is a critical issue.

Deans of research intensive universities report more instances of graduate student misconduct and believe that they are not doing an effective job of preparing graduate students to deal with ethical issues in the field. But, they are also less likely than their peers from doctoral and comprehensive institutions to endorse an active role for the university in values training. In all probability they believe their faculty are "too busy" doing research and training researcher to deal with "soft and peripheral" matters such as ethics and values education. However, the data suggest that role modeling may also suffer in the research intensive academic environment: these universities have more cases of faculty misconduct and are more likely to let faculty resign in lieu of a formal investigation or disciplinary action than other institutions.

These comments are not meant to suggest that the traditional modes of inculcating students into the values of their profession do not work, or that they should be supplanted by formal policies and instruction. But they do lead to the suggestions that, in increasingly complex and driven academic research settings, the traditional modes can prove inadequate by themselves, and need both to be strengthened and buffered by more explicit attention to the ethical problems that can confront graduate students and their faculty. "In less pressured times", Mishkin observes,

> the standards of scientific inquiry were absorbed by young scientists working closely with more senior investigators. The values and traditions of research were passed on from one generation of scientists to the next: respect for primary data, the obligation to report negative findings, and the

> importance of preserving data sheets and biologic materials. Written standards were apparently unnecessary.
>
> Today, senior scientists sometimes assume supervisory responsibilities that exceed their inclination or capacity to fulfill. As a result, young researchers may lack the close relationships essential for learning by example the values and methodologies basic to scientific inquiry. (Mishkin, 1988: 1932)

University policies and professional ethics. The existence of policies does not guarantee ethical behavior or provide certainty that problems will be recognized and dealt with appropriately. Policies may, however, provide a environment for improving institutional influence over behavior by raising awareness of ethical standards and controlling those who deviate from standards. The fact that our data show that policies--such as teaching ethics in the classroom--are strongly associated with uncovering alleged problems shows that institutional policies can and do have an effect on the local culture. However, policies may also provide an illusion of control. The fact that a small number of institutions--who presumably are more diligent in promoting reporting--have a much large number of instances of ethical problems leads us to believe that many universities who have developed policies are not necessarily as active in ensuring their implementation.

Implementation ranges from efforts to promulgate knowledge of policies among members of the university community, to developing and putting into practice the procedures that should follow from a policy position. And, however diligent an administration may be in these tasks, there are the realities of the indifferent members of the university. As a long-time

faculty member and now medical school dean comments with respect to Mishkin's recommendations for dealing with misconduct:

> Logical as this approach is, the skeptical administrator sees some practical problems with it. For one thing, most scientists are blissfully unaware of their formal code of faculty conduct or their medical staff bylaws and are unlikely to become familiar with an even longer and more depressing list of negative commandments. The independence of mind that allows creativity in science is characteristically coupled with a cavalier attitude toward most university rules and notices (Friedman, 1988: 1397)

The university's moral role in research and graduate education. A final, major topic for discussion stimulated by the survey is the role of the university in promoting ethical standards and dealing with ethical problems in research and graduate education. As professionals, society has granted scientists and scholars the right of self-governance in matters of defining and practicing ethical behavior, based on the value systems presumably transmitted through education and apprenticeship and the larger culture of their field and its professional organizations and institutions. To the extent that self-governance is perceived to erode, professionals become subject to controls from without, in the form of administrative policies, regulations, laws, etc. By and large, universities have also retained a great deal of autonomy, notwithstanding the vast number of federal and state laws and regulations with which they must comply.

Policies are, as we have noted, only one facet of the university's governance role and they are generally developed as a demand for them arises

in response to external requirements or internal needs to codify various aspects of the academy's mission, standards and requirements. Obviously, not all policies bear on the moral life of the university and its members, nor can policies guarantee or substitute for personally and professionally based morality. However, as we have indicated, policies relevant to ethical standards and problems, such as those involved in research and graduate education, can reflect the value climate of the institution and help create an environment in which these matters are viewed as "serious things".

In terms of the long-range effects of policies, it may not matter whether they are internally generated or developed in response to external mandates or pressures. It seems reasonable to suppose, though, that the receptivity of faculty and students to a policy, and at least initially how readily it is implemented, will vary with its source: e.g., whether it is initiated by faculty or graduate students (such as an honor code or code of conduct), by administration or by an outside mandate.

In our judgement, the majority of ethically-relevant issues that the deans judge as "critical" in terms of requiring major policy attention are seen as significant because of present or impending external trigger, such as legal concerns, laws or regulations. And, as we have suggested, other issues that deans do not presently see as critical policy matters, such as misconduct, may become so due to external pressures and/or the effort of higher education and professional associations to foster the adoption of their own policies to avert more stringent and rigid federal regulations. This does not mean that the university community is inattentive to or unconcerned about its ethical climate and activities. But, we would close by suggesting that the academy and its members are too often reactive rather than proactive in openly

addressing the complex values and ethical issues that confront those involved in research and graduate education.

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Table 1: Response Rates to the Survey of Graduate School Deans by Carnegie Classification

	Sample Size	Response Rate[1]
All Institutions	392	268
Research I	70	81%
Research II	34	88%
Doctoral I	49	75%
Doctoral II	49	67%
Comprehensive[2]	154	62%
"Other"[2]	36	47%

1 Excludes late respondents. Includes questionnaires that were later eliminated because of missing data.

2 Many non-respondants in this group indicated that the survey was not applicable to their institution.

Table 2: Number of instances of possible faculty conflict of interest or commitment reported to Dean's Office during the past five years.

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
None	130 (52%)	34 (37%)	32 (46%)	56 (71%)	99 (54%)	31 (46%)	60 (75%)	53 (45%)	17 (31%)
1-5	99 (39%)	41 (45%)	31 (45%)	23 (29%)	65 (35%)	34 (51%)	19 (24%)	55 (47%)	25 (46%)
6-15	14 (6%)	11 (12%)	3 (4%)	0 (0%)	12 (7%)	2 (3%)	0 (0%)	5 (4%)	9 (16%)
40 or more	9 (4%)	6 (7%)	3 (4%)	0 (0%)	9 (5%)	0 (0%)	1 (1%)	4 (3%)	4 (7%)
No response	7	1	1	4	3	4	3	3	1
Total	252	92	69	79	185	67	80	117	55
		Tau = -.271 Sig. = .001			Tau = .019 Sig. = .3732		Tau = .304 Sig. = .001		

Table 3: Number of instances of possible faculty research misconduct reported to Dean's Office during the past five years.

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
None	147 (60%)	36 (40%)	44 (64%)	58 (77%)	104 (58%)	43 (65%)	61 (81%)	70 (59%)	16 (31%)
1-5	92 (38%)	49 (55%)	24 (35%)	16 (21%)	70 (39%)	22 (33%)	14 (19%)	44 (37%)	34 (65%)
6-12	6 (2%)	4 (5%)	1 (1%)	1 (1%)	5 (3%)	1 (2%)	0 (0%)	4 (3%)	2 (4%)
No response	14	4	1	8	9	5	8	2	4
Total	245	89	69	75	179	66	75	118	52
		Tau = -.297 Sig. = .001			Tau = -.058 Sig. = .150		Tau = .340 Sig. = .001		

Table 4: Number of instances of possible graduate student research misconduct reported to Dean's Office during the past five years.

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
None	145 (59%)	44 (49%)	41 (60%)	51 (69%)	101 (57%)	44 (67%)	51 (71%)	68 (58%)	26 (48%)
1-5	86 (35%)	36 (40%)	25 (37%)	22 (30%)	66 (37%)	20 (30%)	20 (28%)	45 (38%)	21 (39%)
6-15	13 (5%)	10 (11%)	2 (3%)	1 (1%)	11 (6%)	2 (3%)	1 (1%)	5 (4%)	7 (13%)
No response	15	3	2	9	10	5	11	2	2
Total	244	90	68	74	178	66	72	118	54
			Tau = -.179 Sig. = .002		Tau = -.084 Sig. = .069			Tau = .176 Sig. = .002	

Table 5: Number of instances of faculty research misconduct formally or informally verified during the past five years.

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
None	189 (80%)	58 (68%)	57 (84%)	63 (89%)	139 (80%)	50 (79%)	65 (90%)	95 (83%)	29 (59%)
1-3	47 (20%)	27 (32%)	11 (16%)	8 (11%)	34 (20%)	13 (21%)	7 (10%)	20 (17%)	20 (41%)
No response	23	8	2	12	15	8	11	5	7
Total	236	85	68	71	173	63	72	115	49
			Tau = -.189 Sig. = .001		Tau = .011 Sig. = .434			Tau = .219 Sig. = .001	

Table 6: Number of instances of graduate student research misconduct formally or informally verified during the past five years.

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
None	164 (70%)	55 (65%)	46 (70%)	53 (75%)	119 (69%)	45 (74%)	57 (80%)	72 (65%)	35 (67%)
1-5	65 (28%)	27 (32%)	19 (29%)	17 (24%)	49 (28%)	16 (26%)	13 (18%)	38 (34%)	14 (27%)
6-15	5 (2%)	3 (4%)	1 (2%)	1 (1%)	5 (3%)	0 (0%)	1 (1%)	1 (1%)	3 (6%)
No response	25	8	4	12	15	10	12	9	4
Total	234	85	66	71	173	61	71	111	52
		Tau = -.088 Sig. = .081			Tau = -.044 Sig. = .201		Tau = .116 Sig. = .030		

Table 7: Proportion of reported instances of possible faculty conflict of interest or commitment which were formally or informally investigated.[1]

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
None	17 (14%)	5 (9%)	8 (22%)	3 (13%)	12 (14%)	5 (14%)	3 (15%)	9 (14%)	5 (13%)
Some	38 (31%)	21 (36%)	11 (31%)	6 (26%)	32 (37%)	6 (17%)	7 (35%)	17 (27%)	14 (37%)
All	66 (55%)	32 (55%)	17 (47%)	14 (61%)	42 (49%)	24 (69%)	10 (50%)	37 (59%)	19 (50%)
Total	121	58	36	23	86	35	20	63	38
		Tau = -.026 Sig. = .379			Tau = .138 Sig. = .053			Tau = -.015 Sig. = .431	

1. Table includes only those institutions which indicated both the number of instances reported and the number of instances investigated.

Table 8: Proportion of reported instances of possible faculty research misconduct which were formally or informally investigated.[1]

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
None	6 (6%)	2 (4%)	4 (17%)	0 (0%)	6 (8%)	0 (0%)	0 (0%)	5 (11%)	1 (3%)
Some	15 (16%)	8 (15%)	2 (8%)	4 (24%)	13 (18%)	2 (9%)	4 (31%)	6 (13%)	5 (14%)
All	75 (78%)	42 (81%)	18 (75%)	13 (76%)	54 (74%)	21 (91%)	9 (69%)	36 (77%)	30 (83%)
Total	96	52	24	17	73	23	13	47	36
		Tau = .094 Sig. = .140			Tau = .089 Sig. = .057			Tau = .010 Sig. = .455	

1. Table includes only those institutions which indicated both the number of instances reported and the number of instances investigated.

Table 9: Has the institution accepted a faculty member's resignation in lieu of a formal investigation or disciplinary action?

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Never	172 (86%)	54 (79%)	51 (90%)	58 (91%)	127 (85%)	45 (88%)	60 (94%)	76 (84%)	36 (78%)
Sometimes	23 (12%)	11 (16%)	4 (7%)	6 (9%)	19 (13%)	4 (8%)	4 (6%)	11 (12%)	8 (17%)
Always or Almost Always	5 (3%)	3 (4%)	2 (4%)	0 (0%)	3 (2%)	2 (4%)	0 (0%)	3 (3%)	2 (4%)
No response	59	25	13	19	39	20	19	30	10
Total	200	68	57	64	149	51	64	90	46
			Tau = -.131 Sig. = .027			Tau = -.020 Sig. = .319		Tau = .159 Sig. = .008	

Table 10: Has the institution accepted a graduate student's withdrawal in lieu of a formal investigation or disciplinary action?

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Never	146 (74%)	45 (65%)	44 (77%)	52 (84%)	112 (75%)	34 (74%)	54 (87%)	60 (67%)	32 (71%)
Sometimes	40 (20%)	18 (26%)	12 (21%)	8 (13%)	30 (20%)	10 (22%)	7 (11%)	21 (24%)	12 (27%)
Always or Almost Always	10 (5%)	6 (9%)	1 (2%)	2 (3%)	8 (5%)	2 (4%)	1 (2%)	8 (9%)	1 (2%)
No response	63	24	13	21	38	25	21	31	11
Total	196	69	57	62	150	46	62	89	45
			Tau = -.172 Sig. = .006			Tau = .0030 Sig. = .475			Tau = .138 Sig. = .019

Table 11: Percentage of institutions with existing policies in selected areas

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Consulting	88%	95%	91%	80%	89	85	81	90	95
Patent ownership/royalties	78	91	81	61	81	72	64	82	93
Hazardous substances in research	70	74	79	55	75	56	58	77	73
Plagiarism	70	79	73	59	73	62	66	72	73
U.-industry res. rels.	54	69	54	37	54	55	41	55	73
Publication restrictions to protect funding sources	52	74	46	35	54	48	30	54	80
Fac. involvement in firms whose prods. are based on their res.	50	62	54	31	53	42	31	54	68
Other sources of conflict of int./ commitment	45	62	41	29	45	44	37	40	66
Procedures for dealing with allegations of misconduct	39	61	37	15	41	34	15	44	64
Access to data	38	45	39	33	40	32	35	36	48

Table 11 (continued): Percentage of institutions with existing policies in selected areas

	All Institutions	Carnegie Classes			Auspices		External Funding for Research		
		Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Res. misconduct	36	60	31	15	37	34	15	38	64
Definition of misconduct	36	55	36	15	41	24	15	41	59
Genetic engin. res.	34	53	36	13	35	31	13	36	59
U. investments in fac. firms	32	50	30	21	33	31	17	33	55
Fac. superv. of colleagues/ grad. stds.	31	33	34	25	31	31	22	34	39
Disclosure of misconduct to res.sponsors	29	41	30	11	31	21	10	35	43
Grad. Std. consulting	29	31	36	17	31	21	21	32	34
Univ.-military res. rels.	27	23	30	30	29	24	27	29	25
Disclosure of misconduct to others	21	32	21	7	25	11	6	25	36
Pub. guidelines (authorship, etc.)	21	23	23	17	23	16	21	20	23
Recommendations and References	20	22	19	19	22	13	16	21	23
U.-foreign govt. res. rels.	14	22	11	6	16	7	7	13	25

Table 12: Percentage of institutions in which policy development has taken place within the last three years.[1]

	All Institutions	Carnegie Classes			External Funding for Research		
		Research	Doctoral	Comprehensive	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Patent ownership/ royalties	57	59	71	45	47	63	59
Research misconduct	54	73	57	--	33	57	79
Hazardous substances in research	44	39	53	42	43	52	--
University-industry research relations	43	46	41	42	39	43	46
Plagiarism	36	36	44	--	--	43	--
Faculty involvement in firms whose products are based on their research	35	41	39	--	--	33	43
Consulting	--	--	--	33	--	--	--
Disclosure of misconduct to research sponsors	--	--	--	--	--	--	38

1. As there are no differences between public and private institutions, we have chosen not to present this data. The table indicates those areas of policy development in which at least one-third of the institutions have been active during the last three years. Other areas covered in the survey but not meeting this criterion are: publication restrictions to protect funding sources, access to data, university-military relations, genetic engineering research, faculty supervision of colleagues and graduate students, university investments in faculty firms, graduate student consulting, publication guidelines (authorship, retraction), recommendations and references, university-foreign government research relations, definition of research misconduct, procedures for dealing with allegations of research misconduct, and disclosure of misconduct to parties other than research sponsors.

Table 13: Predicting Policy Ferment: Stepwise Multiple Regressions[1]

	Number of Areas of Policy Change in Previous 3 Years
Predictor Variables	
Carnegie Class R1&2 (dummy)	
Carnegie Class Doc1&2, (dummy)	.16*
Carnegie Class Compre. (dummy)	.14*
Private/Public (dummy)	
Log # of Faculty	.15*
Log External Res. $	
Log Ext. Res $ per Fac.	
# of preexisting res. policies	.30***
Level of policy ferment	
Multiple R (partial equation)	.35
Multiple R2 (partial equation)	.12
Multiple R2 (full equation)	.13

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[1] This table presents standardized regression coefficients only for those variables that contributed at least 1 percent to the multiple R. The second to the bottom line shows the multiple R^2 for the equation including the variables shown; the last line shows the multiple R2 including all variables. All equations have an F statistic that is significant at the .001 level or better.

* - sig. at .10
** - sig. at .05
*** - sig. at .01 or better

Table 14: Effectiveness of the institution in preparing graduate students to deal with ethical issues in specific fields[1]

	All Institutions	Carnegie Classes			Auspices		External Funding for Research		
		Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Life Sciences									
Very or quite	63	58	64	57	58	77	66	66	54
Not very or not at all	37	43	36	29	42	23	34	34	46
Chemical/Physical Sciences									
Very or quite	48	38	52	57	45	60	58	50	33
Not very or not at all	52	62	48	43	56	40	42	51	68
Social/Behavioral Sciences									
Very or quite	71	67	72	76	67	83	74	74	60
Not very or not at all	29	33	28	24	33	18	26	26	40
Computer Sciences									
Very or quite	34	29	38	33	30	45	39	37	18
Not very or not at all	66	71	63	67	70	55	61	63	82
Engineering									
Very or quite	39	32	55	32	36	47	46	42	27
Not very or not at all	61	68	46	68	64	53	54	58	73

[1] Table shows percentage of respondents who gave their institutions the rating shown.

Table 15: How active a role should the university take in preparing graduate students to recognize and deal with ethical issues in their professional or scholarly field as part of their training?

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Very active	122	42	26	47	88	34	43	58	21
	(47%)	(45%)	(37%)	(57%)	(47%)	(48%)	(52%)	(48%	(38%)
Active	101	35	33	30	74	27	33	48	20
	(39%)	(38%)	(47%)	(36%)	(39%)	(38%)	(40%)	(40%)	(36%)
Somewhat Active	33	15	11	4	24	9	5	14	14
	(13%)	(16%)	(16%)	(5%)	(13%)	(13%)	(6%)	(12%)	(25%)
Not very or not at all active	3	1	0	2	2	1	2	0	1
	(1%)	(1%)	(0%)	(2%)	(1%)	(1%)	(2%)	(0%)	(2%)
Total	259	93	70	83	188	71	83	120	56
		Tau = -.104			Tau = .006			Tau = -.117	
		Sig. = .035			Sig. = .460			Sig. = .013	

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Table 16: Does your university expect that departments will commit instructional time in their graduate programs to ethical issues?

		Carnegie Classes			Auspices		External Funding for Research		
	All Institutions	Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
Yes, this is a clearly stated or written expectation	25 (10%)	6 (7%)	5 (7%)	11 (14%)	9 (5%)	16 (23%)	9 (11%)	11 (9%)	5 (9%)
Yes, this is an informal expectation	128 (51%)	45 (50%)	35 (50%)	41 (52%)	99 (54%)	29 (41%)	43 (54%)	66 (56%)	19 (35%)
No, this is up to the department	100 (40%)	40 (44%)	30 (43%)	27 (34%)	74 (41%)	26 (37%)	28 (35%)	42 (35%)	30 (56%)
Total	253	91	70	79	182	71	80	119	54
			Tau = -.096 Sig. = .053			Tau = .115 Sig. = .025		Tau = -.112 Sig. = .026	

Table 17: Predicting Conflict of Interest and Misconduct: Stepwise Multiple Regressions[3]

	Dependent Variables		
	# Reported Confl. of Interest	# Reported Cases of Faculty Miscond.	# Reported Cases of Grad. Std. Miscond
Predictor Variables			
Carnegie Class R1&2 (dummy)			
Carnegie Class Doc1&2. (dummy)			
Carnegie Class Compre. (dummy)			
Private/Public (dummy)	-.10*		
Log # of Faculty			.21***
Log # of Students			
Log External Res. $	.19***	.18***	
Log Ext. Res $ per Fac.			
# of preexisting res. policies	.07	.18***	.20***
Policy on teaching ethics			.21***
Level of policy ferment			
Multiple R (partial equation)	.27	.31	.38
Multiple R2 (partial equation)	.07	.10	.14
Multiple R2 (full equation)	.08	.14	.16

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3. This table presents standardized regression coefficients only for those variables that contributed at least 1 percent to the multiple R. The second to the bottom line shows the multiple R^2 for the equation including the variables shown; the last line shows the multiple R2 including all variables. All equations have an F statistic that is significant at the .001 level or better.

* = sig. at .10
** = sig. at .05
*** = sig. at .01 or better

Table 18: Issues viewed as critically important for the next five years [1]

	% of deans rating issue as critically important	% of deans rating the issue among the four most critical issues
Animal care and use	18	41
University-industry research relationships	16	47
Use of hazardous substances in research	15	30
Human subjects research	14	22
Patent ownership and royalties	13	26
Due process procedures for alleged violators of university policies	11	18
Disclosure of research misconduct to funding agencies, collaborators, employers, etc.	10	--
Procedures for reporting and investigating research misconduct	--	21
Consulting or other work outside the university (faculty)	--	20
Definition of research misconduct	--	19
Conflict of interest -- faculty investments	--	17
Genetic engineering research	--	16
Plagiarism	--	12
Reporting/disclosure requirements regarding conflict of interest policies	--	10

[1] The table includes only issues rated as important by at least ten percent of the deans surveyed. Other issues in the survey not meeting this criterion are: university-military research relationships, university-foreign government research relationships, access to data, consulting/other work outside the university (graduate students), faculty supervision of junior colleagues/students, publication restrictions to protect funding source interests, scholarly publication issues (authorship, retraction), university investments in firms owned by faculty or whose products are based on faculty research, and recommendations and references for faculty and students.

Table 19: Factor Analysis of Critical Research Policy Issues

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Animal care/use	.147	.194	.094	.755	.214
Human subjects	.082	.118	.066	.532	.583
Genetic engineering research	.337	.146	.206	.745	-.051
Use of hazardous substances in research	.283	.149	.212	.757	-.017
U-indus. res. rels.	.715	.234	-.013	.189	.126
U-military res. rels.	.746	.075	.196	.201	.053
U-foreign govt. research relationships	.631	.062	.280	.286	.196
Patent ownership and royalties	.694	.160	.119	.244	.229
Access to data	.318	.125	.491	.083	.333
Consulting/faculty	.410	.047	.321	-.084	.397
Consulting/grad. stds.	.184	.048	.767	.228	.175
Fac. supervision of junior colleagues/stds.	.112	.267	.672	.132	.192
Due process	.177	.508	.344	.081	.317
Restriction of publication to protect funders interests	.631	.208	.308	.175	-.002
Scholarly publication issues	.262	.303	.668	.133	.123
Conflict of interest-- faculty investments	.552	.350	.428	.031	-.009
University investments in fac.firms	.538	.111	.593	.221	-.063

Table 19: Factor Analysis of Critical Research Policy Issues (cont.)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Disclosure -- conflict of interest	.579	.356	.400	.068	.203
Definition of research misconduct	.157	.872	.165	.187	.111
Procedures for reporting and investigating research misconduct	.196	.873	.133	.190	.182
Disclosure of misconduct to res. sponsors	.319	.747	.208	.164	.249
Recommendations and references	.129	.172	.134	.011	.727
Plagiarism	.064	.384	.204	.111	.630
Eigenvalues: 1.003	9.428	1.857	1.491	1.180	
Percent:	41.0	8.1	6.5	5.1	4.4

Table 20: Mean responses for issue importance factors (1=not important; 5=critical)

	All Institutions	Carnegie Classes			Auspices		External Funding for Research		
		Research	Doctoral	Comprehensive	Public	Private	Less Than $5 Million	$5 Million To $50 Million	More Than $50 Million
		n=93	n=70	n=83	n=188	n=71	n=83	n=120	n=56
Factor 1	2.90	3.15	3.04	2.61	2.95	2.76	2.55	3.03	3.11
			F = 11.684 Sig. = .001		F = 2.662 Sig. = .128			F = 12.402 Sig. = .001	
Factor 2	3.19	3.37	3.21	3.04	3.23	3.08	3.03	3.20	3.40
			F = 3.413 Sig. = .035		F = 1.551 Sig. = .214			F = 3.181 Sig. = .043	
Factor 3	2.65	2.70	2.70	2.61	2.67	2.59	2.60	2.70	2.61
			F = .392 Sig. = .676		F = .610 Sig. = .436			F = .552 Sig. = .576	
Factor 4	3.34	3.55	3.46	3.01	3.39	3.19	2.93	3.51	3.55
			F = 10.471 Sig. = .001		F = 2.988 Sig. = .085			F = 15.077 Sig. = .001	
Factor 5	2.92	2.88	3.00	2.94	2.96	2.83	2.94	2.98	2.79
			F = .515 Sig. = .598		F = 1.563 Sig. = .212			F = 1.117 Sig. = .329	